TIDEWATER INDUSTRIAL PARKS

Prepared for:

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BUILDING BLOCKS FOR ECONOMIC DEVELOPMENT & ANALYSIS

PREFACE

PURPOSE

Building Blocks have been conceived and developed by the Economic Development Branch of the Ministry of Sustainable Resource Management, under the guidance of Nancy South, Manager Economic Analysis, as an analytical tool that supports British Columbia coastal and land and resource use planning and decision-making and economic development initiatives. The Blocks contain concise business and sector information for a broad range of resource-based business types in BC. At this point, there are more than 30 Blocks either complete or in draft form. Several more Blocks have been identified as high priority by planning tables and other client groups. Additional Building Blocks will be developed over time, and some Blocks may be updated. For the most current Building Blocks, please see the Ministry of Sustainable Resource Management website, at: http://srmwww.gov.bc.ca/rmd/ecdev/

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BENEFITS

Building Blocks are expected to provide the following general benefits:

- Increase efficiency and more informed decision-making by providing readily accessible, credible information to planning and economic development processes;
- Improve the consistency of economic information across planning areas;
- Support economic analysis and decision-making that occurs outside formal coastal and land use planning processes; and
- Provide linkages between economic analysis and other social and environmental analytical tools (through identifying resource requirements to support economic activities and general compatibilities with other sectors and values).

LIMITATIONS

Every effort has been made to ensure that the information contained in Building Blocks is accurate and consistent. Approved, credible data sources are the foundation for Building Blocks. All Blocks were reviewed by sponsoring agencies and other experts. However, users are cautioned that information is used at their own risk, and that the authors and sponsors are not liable for any damages. Any conclusions or interpretations by the authors are not intended to represent government policy. Also, note that Building Blocks do not provide site specific information nor do they consider requirements for sustainability (social, community, environmental).

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1.0 OVERVIEW

Tidewater industrial parks are typically created either to take advantage of a niche market opportunity, and/or to encourage the growth of businesses involved in or dominated by the movement or transhipments of goods using water borne transport, including barges and deep-sea ships.

Tide water industrial parks vary in size:

- The *Port of Vancouver* is an example of a very large matured industrial park with mixed businesses having their own industrial waterfront with ship berthing and loading facilities. This large multi-use complex with 29 cargo and marine related terminals handles over 70 million tonnes of cargo annually.
- *Annacis Island* was developed as a mixed use industrial park, with some occupants dependant on access to water frontage to carry out their business. Industries using water frontage include Canron, Westroc and Domtar.
- *Nanaimo Port (Duke Point)* is a tidewater industrial park, primarily based around forest products. It has 600 ft. of berth space, a barge ramp, and 6 Ha (hectares) of paved open storage. The Duke Point industrial park serving the waterfront has 101 Ha of serviced land.
- *Fraser Surrey Docks* is a mixed-goods port with 4,000 ft. of berthing (can handle approximately 12 ships) and with 68 Ha. of fully paved land and storage sheds. It allows on its site small support industries that provide services such as lumber treatment for long sea voyages before loading.
- A small tidewater industrial park is being developed by the Fraser River Port Authority at their *Fraser Richmond* site at No. 3 Road. This park will provide approximately 400 ft to 600 ft. of berthspace (2 to 3) ships and approximately 52 Ha. of marine water front sites. The mixed-use non-tidewater industrial park behind has approximately 140 Ha. of developable ground.

Tidewater industrial parks differ from conventional ports in any or all of the following ways:

- they provide each business with waterfront and upland for their own use;
- barge traffic typically figures highly in these businesses; and,
- it is also possible for businesses in the industrial park to have their own deep sea loading facility, providing a degree of autonomy.

Principal products handled at tidewater industrial parks include: speciality grains, lumber, logs, pulp and paper, fish products and containerized goods. Three dominant sectors that are served by these industrial parks are described below.

- **Economic mineral extraction** is site specific and typically has dedicated barge or deep sea ship loading facilities at the mine or quarry. If the mineral is processed or refined, at the mine, typically the quantity of product is a small fraction of the mined material. Tidewater industrial parks are therefore more typically involved in transhipment of the mineral to users.

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- **Energy extraction and handling** is a very specialised process and industry and tends to be self-contained. Tidewater industrial parks are therefore more typically involved in the marine support services including supplies, repairs, ferrying people and goods etc.
- **Log handling is** again site specific. Trees are logged and loaded onto logging trucks for transportation to the next process, which can be the sawmill. Many are taken to log sorts similar to the one shown in Figure 1 at the end of this report. The logs are sorted and lifted into the water where they are formed into log booms to be towed to sawmills or to log ships for export. The logs, once cut and dressed, are formed into bundles at the sawmills. The resulting lumber parcels are ideal for transporting to the industrial park by barge and exporting either by ship or rail.

1.1 Key Aspects Driving the Success of a Tidewater Industrial Park

- best located in or near large population centres, which can support the business and provide a pool of trained labour;
- flexibility to respond to change in the market and products being shipped; and,
- opportunities for stability and future growth.

1.2 Who are the investors?

- The businesses attracted to this investment are often typically existing successful businesses looking for improved opportunities. A new industrial park is likely to emerge in response to a specific industry expansion or industrial opportunity.

1.3 Economic Activity

- Typically, businesses that use tidewater industrial parks will be heavily involved in transhipment of water borne goods both by barge and deep sea ships. Activities could include the following:
  - marshalling lumber from sawmills and exporting by rail or ship;
  - container receiving, distribution of contents and or filling of containers for export – e.g., container handling, storage and transhipment with the Port of Vancouver; and delivery to the site, storage, assembly of sawn lumber, and transhipment of sawn lumber to clients by Doman Forest Products;
  - importation of gypsum for manufacture of cement and gyproc buildings boards for the construction industry; and,
  - storage and exportation of specialty grains.
- Land lots and associated water lots are leased under contract to each business, creating revenues for Port Authority.

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1.4 Excluded From Analysis

- Tidewater industrial parks in the context of this report exclude **conventional maritime ports** under the jurisdiction of Federal Port Authorities, as they have well-developed facilities with existing business opportunities and compete heavily for available business. There is often significant specialisation of goods handling and the markets and opportunities of these ports are well documented.
- **Coal** is a specialised product, requiring bulk movement of goods to handle the large yearly tonnages involved. Coal is moved from mines using unit trains, 110 cars long, which requires large assembly areas. Specialised rail car dumps are required which pick up the rail cars and rotate them to dump the coal into hoppers for storage and subsequent loading onto a ship for export such as at Point Roberts BC and is not an appropriate candidate for a tidewater industrial park.
- Similarly, **grain** is collected and stored in silos for export by ship. The large tonnages involved require the transfer of grain from local silos to rail cars to the grain port silos require expensive dedicated equipment. Accordingly grain is not considered an appropriate candidate for a tidewater industrial park. However the small tonnages of specialty grains that are in demand are most suitable.

2.0 RESOURCE ISSUES AND SENSITIVITIES

2.1 Marine Infrastructure and Physical Setting

- Initially parks typically have two to three barge berths plus possibly one to three ship berths. Requirements are as follows:
  - reasonably sheltered waters for barge with 6 metres water depth at low tides and ship access with 11 metres at low tide;
  - navigable access for shipping and tug assistance.

2.2 Upland Resources

- Approximately 12 Ha. of prepared site per business is required.
- Specific requirements pertaining to upland sites will vary depending on operations, condition of ground, availability of road and rail networks and size of park.

2.3 Potential Sensitivities and Conflicts

- public and regulatory agency concern for environmental effects (marine and foreshore) of construction and operation, and need for mitigation measures;
- social impacts of construction and operations on local communities – noise, traffic congestion, illumination, loss of viewscape, increased risk, etc;
- conflicts with other resource values include the replacement of the use of existing port facilities with tidewater industrial parks.

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3.0 INVESTMENT REQUIREMENTS

3.1 Scale of Operations

Generally investment requirements need to be assessed on a case-by-case basis and will depend on the nature of and reasons for the particular project. Maritime structures can range in size from small facilities which allow one or two 60 metre long barges to tie up to steel piles,[1] to single ship berths up to 200 metres long, or major docking facilities such as Fraser Surrey Docks with 800 metres of continuous berth space for 200m long cargo ships.

Other maritime structures may include simple barge ramps for transferring goods between shore and barge.

> *The barge ramp at the Union Bay log sort facility on Vancouver Island is used for transferring goods and consists of a sloping rock fill jetty. A similar rock-filled ramp jetty is located on the west side of Texada Island on the property of Texada Quarrying Ltd., and is used to allow barge access for transporting large rock sections for riprap etc. (see photo in Figure 1)*

3.2 Capital Costs

The following costs are presented as a guide only, and are drawn from a body of extensive work in the construction and operation of marine structures.

Start up/capital costs will vary substantially depending on the type of facilities, and size and sophistication of the facility. Other factors which can significantly affect cost are site location, water depth, site exposure, site preparation, geotechnical conditions, utility requirements, labour and material costs and market conditions (more detail in ***Appendix A***).

> *A new 900 ft long marginal reinforced concrete berth at Fraser Surrey Docks cost approximately $12 million to construct. This included dredging of the sandy river bed, concrete piles and reinforced precast concrete deck reinforced to support container cranes and container truck traffic.*
>
> *A new single ship berth with steel dolphins and a 3.6m wide reinforced concrete fixed access trestle for forklift access was approximately $1.2million to construct.*

Order of magnitude costs for construction of typical infrastructure are as follows:[2]

- marginal wharves for cargo ships – $2,500 to $3,000 / m^2
- Light pier, access trestle construction – $500 to $1,500 /$m^2$
- barge facilities (two barges with ramp) – $1.5million
- floating docks (small craft) – $250 to $600 /$m^2$ depending on type of float systems – concrete, timber etc. (excluding mooring systems, site preparation and utilities)

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Ongoing operational costs include repairs, maintenance, operations:

- pier, access trestle repair/upgrade – $200 to $750 /$m^2$ depending on amount and nature of repairs. At repair cost levels above 50% of replacement cost, it is usually more economical to demolish and rebuild.
- maintenance costs are affected by the expected life of the structure. Timber structures, with shorter expected lifespan (around 25 to 30 years) may have higher maintenance costs than a concrete or steel structure with life expectancy closer to 50 years.
- information on operational costs unavailable.

4.0 INFRASTRUCTURE

The development of a tidewater industrial park requires a range of infrastructure, both in the water and on land. Basic upland infrastructure includes the following:

- utilities – power, water, fuel, waste disposal, tank storage;
- road access;
- rail access (not essential but highly desirable).

Features of land and amenities required for potential businesses:

- serviced sites – utilities, sewage;
- rail spurs and road access from rail and road networks; and,
- water frontage to each business lot for barges and preferably access to deep-sea berths.

Depending on the size and complexity of the industrial park, some or all of the following infrastructure may be required.

Marine infrastructure

- fixed and floating docks (piers, floats, jetties, bulkheads)
- access trestles, ramps and gangways
- boat launching ramps
- waterways – navigable channels, turning basins, shipping lanes
- environmental protection systems (breakwaters, beach and foreshore protection)
- berthing and mooring systems (dolphins, buoys, mooring bollards, fenders)
- navigation and communication systems (lights, markers, buoys, radio beacons)

Construction of uplands

- asphalt yards and laydown yards
- storage buildings
- cranes
- fork loaders
- conveyors
- water and fire mains

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Operations

- crates and containers
- truck and rail transport
- workshops
- tugs
- pilots
- catering and maintenance

5.0 MARKET

Tidewater industrial parks play an important supporting role in the manufacturing and shipment (either export or import) of a specific good or range of goods. Hence, the demand for industrial tidewater parks is driven by the demand for those products shipped through it, and market conditions can change quickly. Factors influencing markets include changes in consumption patterns, competition, exchange rates, and stability of resource supply and export markets. All of this points to the need for flexibility to be able to weather market downturns, rather than rigid specialization in one product.

5.1 Services Provided

- Tidewater industrial parks exist to facilitate marine shipment of goods to destinations within the province, or to/from markets elsewhere in Canada, in the US and overseas.
- The configuration of, and activity at, the industrial park will vary according to what is being shipped or transhipped, and how – e.g., rail-marine, road-marine, container/bulk, etc.

5.2 Market Demand

- The status of markets for selected key products shipped through BC ports[3] are as follows:

  Exports:

  - **lumber** and **forest products** are shipped either by rail or through BC ports to the US and other international markets – new US tariff will dampen US market for lumber;
  - the value of **market pulp** exports from BC have stayed at a steady level since 1997 – considerable global competition in this product will reduce BC's competitive position in the long term;
  - **newsprint:** the value of newsprint exports from BC declined between 1997 and 2001;
  - **other paper products:** value of wood-containing fine and lightweight papers, and kraft paper, exported from BC increased in 1997-2001; BC is not a major producer of wood-free paper;
  - **salmon** (fresh or chilled): export value from BC rose 21 percent in 1997-2001;

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- **construction aggregate** (gravel, rock and sand): demand tied to fortunes of US economy; US investment in road & other infrastructure has kept demand for construction aggregate strong, esp. in California; Hawaii and Japan also big markets;
- **oil and gas**: Buoyant prices and demand have triggered oil and gas exploration in Alberta and BC during the past two years – Alberta's economy has benefited. The need to develop alternative fuel sources is stimulating US interest in Canadian reserves.

Imports:

- autos, auto parts, consumer goods, and electronic parts/goods constitute a significant share of goods shipped into BC ports – destined for the BC market, or elsewhere in Canada; the trends is a positive one, with the value of all imports into BC rising by 36 percent between 1997 and 2001[4]
- gypsum from Mexico and other sources is a major commodity shipped through BC ports – it is used in the manufacture of cement and gypsum board (one producer is Westroc on Annacis Island).

6.0 LABOUR MARKET & SKILLS REQUIRED

6.1 Construction

- Employment in a variety of trades is generated during the construction of a new tidewater industrial park. The basic infrastructure can be completed in as little as 6 to 12 months, or can take a number of years. Construction on land can be full time for the duration of the project; marine construction can be full time if the location is sheltered. Construction often employs local workers or, where specialized skills are not locally available, workers from elsewhere in the province. Typical trades would include:
  - marine construction
  - precast concrete
  - steel fabrication
  - electrical
  - civil and building construction
  - supply and installation of materials handling equipment
- Contractors in the construction sector generally charge out at about $50.00 per hour. Average hourly wage rate for construction workers is approximately $25.00, net of benefits.

6.2 Operations

- longshoremen
- truckers
- rail workers
- operators
- catering and maintenance

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7.0 CAPACITY

7.1 Constraints to Growth

- While there are many locations on the BC coast where the physical setting can accommodate an industrial park, the decision to build a new operation is shaped by several factors:
  - proximity to population centre, pool of labour, and other modes of transportation
  - proximity of other, competing parks;
  - status of competition: presently, there is underutilization at some existing industrial tidewater parks, such as Duke Point;
  - proximity to domestic/overseas markets vis a vis competitors;
  - level of flexibility in accommodating a range of products.

7.2 Potential for Growth

Future growth is driven by:

- the demand for the product in traditional and new, or niche, markets;
- competition from other sources;
- the stability of consumer/industrial demand; and,
- resource availability/scarcity.

7.3 Opportunities for Expansion

- The development of a new tidewater industrial park in BC will be related to a specific industrial operation or development. Areas of export growth include (but are not limited to):
  - construction aggregate;
  - value added forest products – e.g. lightweight papers, processed lumber and wood products;
  - adding value and exporting finished products – e.g., iron ore from South America is processed into iron at a coastal smelter, then shipped to Japanese market;
  - oil and gas – highly specialized shipping process, and generally loaded in locations away from population centres due to risk.

8.0 REGULATORY REGIME

8.1 Process of Securing Approvals

- The construction and operation of tidewater industrial parks must comply with a host of federal, provincial, regional district and/or municipal regulations. A proponent planning to construct a new industrial park will initially contact the relevant provincial or federal government agency to undertake the application process. The first point of contact is generally Land and Water BC, which administers the *Provincial Land Act*, and has jurisdiction over all Crown land. This agency, in turn, can refer the proponent to other provincial and federal agencies that also have regulations governing use of the project site.

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- Construction projects in coastal waters almost always require permitting by Canadian Coast Guard, which administers the *Federal Navigable Waters Protection Act* (FNWPA). Applications to the Coast Guard generally also trigger the federal Department of Fisheries and Oceans (DFO) and/or the provincial Ministry of Agriculture, Fish and Food (MAFF) approval processes. Generally, the agencies select a lead agency to oversee a joint approval process.

8.2 Triggering an Environmental Review

- If the project is deemed to be small, or below a certain "threshold," and in compliance with all regulatory requirements, Land and Water BC will issue a License of Occupation, and the Coast Guard will also issue a permit for the project to proceed.[5]
- Projects over a certain size, or with significant potential impacts, may "trigger" either a **provincial** or a **federal environmental review process**. The environmental agency coordinates the full process, often including a public consultation program.
- Depending on the nature and location of the project, the proponent will also be required to meet certain **municipal** or **regional district** approval processes, such as zoning bylaws, or compliance with Official Community Plans. The proponent is generally responsible for assuring compliance with these governments, separately from the provincial approval process.
- If the proponent is required to deal with a **Port Authority**, this may translate into additional regulations over and above those of the provincial and federal governments.

8.3 Duration of Process

- Land and Water BC has a policy of managing regular applications (that do not require environmental review process) in 140 days or less.
- If an environmental review is triggered, the entire process can last from a few months to a few years, depending on the information required, the deemed effects, and amount of consultation required. The process of submitting an application can take a long time, and generate considerable costs, depending on the amount and type of information required. For example, a recent environmental application for a gravel port in Bella Coola has cost the proponent over $1 million.[6] However, once the application has been made, the Environmental Assessment Office generally endeavours to make a decision within 6 months.

Specific regulations governing construction and operation of tidewater industrial parks are outlined in ***Appendix B.***

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9.0 GOVERNMENT REVENUES

There is a complex system of Port Authority, federal, provincial and other fees and taxes in effect in British Columbia's harbour and shipping industry. The fees and taxes vary by harbour and Port Authority, and by factors such as ownership of the terminals. For example, The Fraser River Port Authority levels harbour dues, but berthage and wharfage are charged by Fraser Surrey Docks, which owns the terminals.

Generally speaking, the primary sources of government revenue arising from tidewater industrial parks include some or all of the following (this list is not, however, exhaustive):

- payable to Port Authority (if the operation is under the jurisdiction of a Port Authority): harbour dues, wharfage and berthage;
- payable to federal government: stipend from Port Authorities (if applicable), harbour dues, berthage, wharfage, commercial boat registration, tax on business profits, income tax from employees, GST;
- payable to provincial government: property tax, corporate tax on profits, income tax from employees, PST on business inputs; and,
- payable to municipal government: property taxes, payment in lieu of taxes by Port Authorities.

These are described in more detail in ***Appendix C.***

10.0 COEFFICIENT DEVELOPMENT

10.1 Choice of Methodology

Labour estimates associated with the *construction* of a tidewater industrial park can be derived in a number of ways:

- calculate Person Years (PY's) using specific engineering data on trades, project duration and number of manhours of project;
- estimate the labour share of total construction costs (can vary with the project, and be as high as 75 to 80 percent), and divide this by the average project wage (net of benefits) to calculate total PY's of employment; or
- estimate order-of-magnitude construction employment using industry multipliers derived from the BC I/O Model.[7]

More specific information would be required about the type of operation to determine if employment or earnings are generated.

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10.2 Construction Industry Employment Multipliers

In the absence of specific information about the configuration and type of operation being considered, the third, most general approach may be most appropriate if comparing employment impacts related to various levels of capital investment. The appropriate multipliers for "other engineering construction" are:

- direct jobs: 8.31 PY's per $1M of spending
- indirect jobs: 5.51 PY's per $1M of spending[6]

10.3 Wages and Salaries

Wages & salaries will be contingent on collective agreements and level of non-union employment. Total construction employment PY's can be multiplied by average wage per year to estimate total earnings per year. Average hourly wage is estimated at $25 per hour (net of benefits), although this varies by trade.

10.4 Issues Regarding Coefficients

- The methods of calculating employment impacts discussed above produce estimates of *direct* employment only.
- The choice of methodology will be governed by the level of detail of available information. At the pre-feasibility level, approach (2) or (3) above are the most suitable. At the feasibility level, when information on employment & earnings by trade, duration of each construction phase, and industries operating at the industrial park are available, approach (1) can be employed, and will produce the most accurate estimates.

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APPENDIX A: FACTORS AFFECTING CAPITAL COST

- **Site location** may be variable or fixed depending on the use of the facility. For instance an opportunity for ground development for a mixed industrial park with some waterfront and good access to road and rail transportation maybe the deciding factor for location. On the other hand, options for location depending on the most advantageous water depths, protection etc. combined with reasonable land access. Cost levels may be optimized more readily if there are several options for location.
- **Water depth** is a prime consideration when locating a marine facility. The range of marine vessels and their associated drafts (depth of vessel below its waterline) dictate the minimum water depths needed for the facility. If dredging or rock blasting is necessary to achieve the design depth, costs will rise dramatically. Where there is very deep water, it will affect the type of structure that can be constructed and could mean significant costs for suitable marine structures – e.g. longer piles or increased amounts of rock filling and slope protection.
- **Site exposure to weather, wave and tidal action** may require the construction of a breakwater to shelter the marine facility. This can be a significant expense if there are no alternative naturally sheltered sites.
- **Site preparation** such as dredging, underwater blasting, clearance of back-up areas will all influence final costs.
- **Geotechnical conditions**, i.e the type of seabed and soils underneath, will be a major criteria in site choice and costs. A small river may have created deep layers of gravel at its mouth making installation of marine piles relatively easy, while deep loose sand deposits (as found along the Fraser River) may necessitate very long pile systems. Sloped rock surfaces may need socketed pile systems or large amounts of retained fill to create a berth face.
- **Utility requirements** (electricity, sewage) will vary depending on the type of facility and the remoteness of the site.
- **Labour and material costs** will vary depending on current market forces, union/ non-union workforce, accommodation for workforce, shipping requirements to site for materials, amounts and quality of materials among many other economic factors.
- **Market conditions for inputs** will have a direct bearing on costs, influencing such factors as availability of labour and materials, cost of capital among others.

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Investment Requirements	Indicative Guideline Costs
➤ Property acquisition for the provision of serviced sites with appropriate water lots for the construction of berths by the businesses	➤ Costs of both land and services will vary greatly with the location and condition of the site. For example, the Fraser Richmond tidewater Industrial park site is located on an old land fill site which is prone to some differential settlement. Therefore requires additional ground treatment.
➤ New dredging and maintenance	➤ $6.00 per cu. metre if clean ➤ $18.00 per cu. metre ocean dump
➤ Road access to and around the site to each business lot	➤ $1,000 per linear metre
➤ Rail access to each business lot with access for rail spurs to each business lot	➤ unknown – will depend on circumstances
➤ Power, gas and communication services for the site	➤ refer to appropriate utility owners and location of nearest service
➤ Foreshore with berthing capabilities for barges and ships	➤ varies with ship
➤ Possible share of deep sea dock with crane or loaders	➤ docks typically $1,500 per square metre
➤ Future extension of uplands	
➤ Future extension of docks	

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APPENDIX B: REGULATORY REGIME

Key provincial and federal government agencies and corresponding regulations that must be satisfied either during a regular approval process, or a full environmental review, include the following.

Regulatory Agency / Act	Regulatory Requirements and Approval Processes
Provincial	
Land and Water BC – administer the *Provincial Land Act*	➤ Regulates sale, lease, and license of occupation, right-of-way, water lot licenses, special use permits, easements, map reserves and construction on provincial crown lands. Prior to granting occupancy permission, typically requires that approval for proposed works be obtained from other regulatory agencies with jurisdiction over the proposed location of the work.
Provincial Water Act	➤ Water Management dept. of WLAP reviews any activities that may affect volume of water flowing in a watercourse or the morphology of the channel of the watercourse. Typically applies to project drainage systems and effluent discharge or work in a stream.
Ministry of Agriculture, Fish and Food	➤ Provides water-licensing tools to protect fish and fish habitat e.g. riparian rights, management plans for restoration of fish population. Ministry is yet to establish application of Act for development referrals. ➤ Licensing and regulatory control of commercial fishing, fish processing, buying and selling of catches, marine plant and shellfish harvesting and aquaculture. Project review for impact on commercial fisheries etc.
Provincial Wildlife Act	➤ WLAP administers this act for protection of wildlife and conducts reviews of project accordingly.
Federal	
Dept. of Fisheries and Oceans / Ministry of Water, Lands and Air Protection (WLAP) – *Federal Fisheries Act*	➤ Regulates fisheries through the *Federal Fisheries Act* to protect fish and fish habitat. Enforced through the Fish and Wildlife Habitat Protection Program of WLAP. Often, works in and about fish habitat require the approval of WLAP and DFO.
Canadian Coast Guard – *Federal Navigable Waters Protection Act (NWPA)*	➤ Administers the Federal *Navigable Waters Protection Act* (NWPA) that regulates any activity in navigable waters in Canada. Approval under NWPA must be obtained for projects within navigable water. Intent is to ensure all marine and coastal charting is current.
Federal Canadian *Environmental Assessment Act*	➤ Ensures consideration of environmental effects of federal projects. Triggered through the direct or regulatory involvement of a federal agency in a project. Lead by agency with jurisdiction over legislation affecting the project.
Federal Migratory Birds Convention Act	➤ Protection of migratory birds and habitat. Administered by Canadian Wildlife Service of Federal Dept. of Environment.

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APPENDIX C: GOVERNMENT REVENUE SOURCES FOR TIDEWATER INDUSTRIAL PARKS

The following schedule summarizes the principal sources of revenue to Port Authorities and to municipal, provincial and federal governments that could arise from the operation of a tidewater industrial park. Depending on the economic activity and what is being shipped, some or all of these may apply.

Income Type	Description
Port Authority	
Harbour dues	➤ based on value of gross registered tonnage; varies by Port Authority – e.g. rate in Prince Rupert is .0743% of gross registered tonnage for commercial vessels
Wharfage	➤ fee for handling cargo at the terminal. Based on weight or measurement of the cargo and is variable by commodity. For example, Port of Vancouver charges $2.15 per tonne of wood pulp, or $2.43 per thousand board feet of lumber ➤ for containers, fees based on size of container and direction of the container movement. ➤ fee schedules are available on Port Authority websites: e.g., www.vancouverport.com, www.rupertport.com.
Berthage	➤ Fee relating to physical size of a vessel alongside Port Authority berths – e.g., Port of Vancouver charges per metre, with rates varying by coastal, passenger or other vessels
Throughput	➤ in cases where the Port Authority has a contract with the suppliers, a special throughput rate will be negotiated that replaces wharfage and berthage fees – these are confidential ➤ throughput varies by Port Authority: throughput of "tariffed" ports is calculated according to port cost structure and requires federal govt. approval
Municipal	
Property taxes	➤ mill rate on commercial and industrial land based on mill rate on $1,000 of assessed value ➤ varies by municipality and kind of economic activity – e.g., Nanaimo charges 53.215 cents per 000$ of assessed value for major industrial land use, or 5.32% of assessed value
Payments in lieu of taxes	➤ payments in lieu of taxes make by Port Authorities – calculated on a graduated scale. Some Port Authorities and municipalities are still negotiating the formula – e.g., Fraser River Port Authority

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Income Type	Description
Provincial	
School Property Tax	➤ rate varies by class and value of property ➤ major industrial and other rates are available from tax policy branch of BC Ministry of Finance ➤ revenues go into provincial govt. general revenue
P.S.T.	➤ vessels over 500 tonnes are exempt
Employee Income Taxes	➤ Based on the average earnings level in BC for transportation employment ($45,0009) a total of 8.3% is collected in provincial personal income taxes.
Corporate Income Taxes	➤ 13.5% of taxable corporate income.

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APPENDIX D: INFORMATION SOURCES

BC Ministry of Finance, Tax Policy Division

British Columbia Ports Handbook 1998/99 75th. Anniversary edition

British Columbia Statistics

City of Nanaimo, Tax Department

Clover Point Cartographics (March 2000). *Forest and Fisheries Tourism Opportunities Study for the North Coast Forest District.*

Construction of Berth 10, Fraser Surrey Docks 2001

Construction of Berth 9, Fraser Surrey Docks, 1997

Construction of new barge and deep sea ship berth and ship loader at Sechelt BC 2001

Fraser Richmond Port Facility Planning Study – Marine Facilities and Land Use June 1998

Fraser River Port Authority

Fraser Surrey Docks Berth 10 feasibility assessment, February 2000

Gravel storage and loadout facility at Union Bay Log Sort Vancouver Island.

Industry Canada Strategis website

Marlyn Chisholm & Associates (April 2001). *Tourism Opportunity Strategy for the Mid Coast Forest District of BC.*

Powell River Terminal Locations Option Study November 1997

Prince Rupert Port Authority

Sask Trends Monitor, Saskatchewan

Transport Canada, Harbours and Ports Division

The Economist Library of Information

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Figure 1: Aerial View of Log Sort at Union Bay

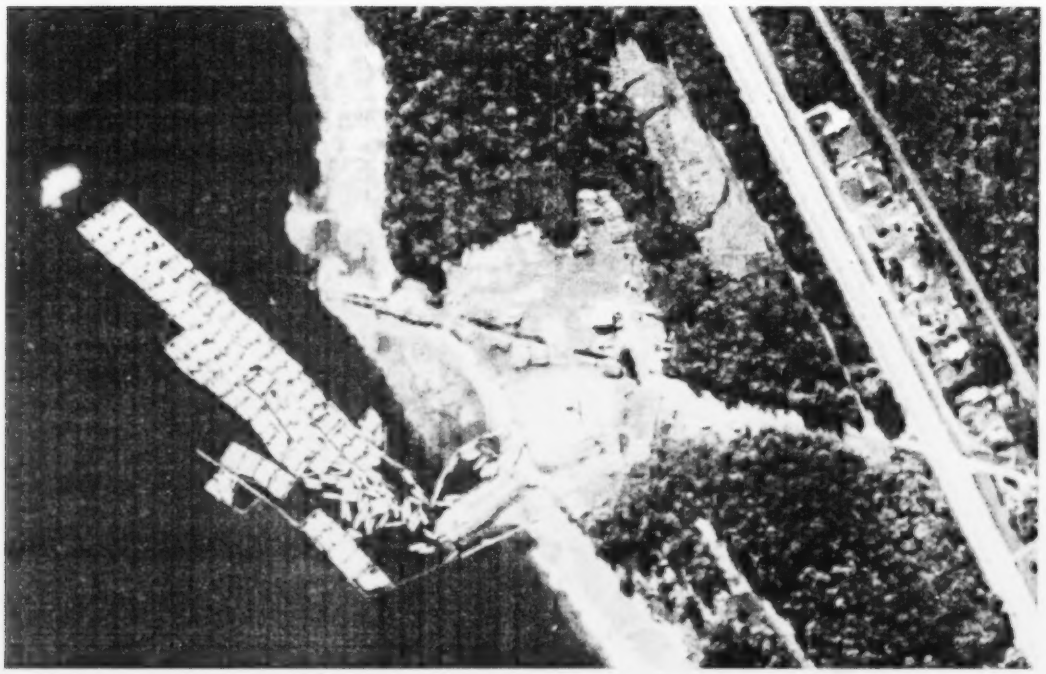

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Figure 2: Barge Facility (loading ramp at top left)

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ENDNOTES

[1] Fixed access trestles or ramps are used to allow front end loaders or forklifts to access the barge from the shore

[2] Source of cost data: information from several marine projects undertaken in British Columbia. A range of costs are provided for reasons identified in ***Appendix A.***

[3] Coal and grain are major export products from BC tidewater industrial parks, but are excluded from the analysis.

[4] www.strategis.ic.gc.ca/sc_mrkti/tdst/tdo/tdo.pho

[5] Likely with certain requirements regarding construction or operation of the structure.

[6] Source: Pentti Leppanen, Land and Water BC, July 2002.

[7] Horne, G. and Powell, C. *Provincial Economic Multipliers and How to Use Them, BC Ministry of Finance*, 2001. (It is not known at the time of writing whether updates to this publication will continue in the future.)

[8] Ibid. based on 2000$; large aggregation; 75% recycle rate

[9] Source: Industry Canada, average wages & salaries for transportation equipment industries. Tax rates from Revenue Canada, July 2002.

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